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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/040,772

01/04/2002

Fred Chen

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8791

7590

02/16/2005

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EXAMINER

ROSASCO, STEPHEN D

ART UNIT

PAPER NUMBER

1756

DATE MAILED: 02/16/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/040,772

Applicant(s)

CHEN ET AL.

Examiner

Stephen Rosasco

Art Unit

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 25 October 2004.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 41-57 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 41-57 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date <u>10/25/04</u> . | 6) <input type="checkbox"/> Other: _____ |

Detailed Action

This is an RCE where all pending claims 1-40 were canceled and new claims 41-57 were added.

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 41-44 and 50-51 are rejected under 35 U.S.C. 102(b) as being anticipated by Pierrat (5,851,734).

Pierrat teaches a process of defining a pattern of a desired width in resist material on a semiconductor wafer, comprising: defining one edge of the pattern by exposing a first portion of the resist material to a resist modifying source through a first mask having first opaque portions; and defining another edge of the pattern by exposing a second portion of the resist material to a resist modifying source through a second different mask having second opaque portions, the opaque portions of the first and second masks overlapping by a distance correlative to the desired width of the pattern.

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the

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international application designated the United States and was published under Article 21(2) of such treaty in the English language.

Claims 41-44 and 50-51 are rejected under 35 U.S.C. 102(e) as being anticipated by Bae (6,821,690).

Bae teaches a photomask comprising: a substrate and first chromium patterns formed on the first quartz substrate;

and a second photomask comprising a second quartz substrate and second chromium patterns formed on the second quartz substrate, wherein chromium patterns are divided into two groups respectively comprising the first chromium patterns and the second chromium patterns in such a fashion that a space defined between adjacent ones of the first or second chromium patterns is more than a space defined between adjacent ones of the first and second chromium patterns so as to avoid a severe diffraction of light passing between adjacent ones of the chromium patterns, and

wherein at least one chromium pattern in one of the chromium groups overlaps, by a desired width, with at least one chromium pattern in the other chromium group arranged adjacent thereto.

wherein the at least one chromium pattern in the one of the chromium groups overlaps, by a desired width, with at least two chromium patterns in the other chromium group arranged adjacent thereto.

wherein at least one of the first chromium patterns overlaps, by a desired width, with at least two of the second chromium patterns, and wherein at least one of the second chromium patterns overlaps, by a desired width, with at least two of the first chromium patterns.

Bae also teaches (see FIGS. 3A and 3B, and col. 4, lines 25-30) schematic views respectively illustrating photomasks of a double photomask according to an embodiment of the

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present invention, and respective intensity distributions of light exhibited in a light exposure process conducted using the photomasks.

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 41-57 are rejected under 35 U.S.C. 103(a) as being unpatentable over Bae (6,821,690) or Pierrat (5,851,734) in view of Pierrat (6,541,165).

The claimed invention is directed to a first and a second mask. The second mask having a second pattern that corresponds to a first pattern of a first mask, the first pattern to expose an exposure feature in a radiation sensitive layer, the second pattern comprising a transparent portion to reduce a proximity effect distortion of the exposure feature by providing modifying radiation to a region of the radiation sensitive layer that contains the exposure feature.

Rather than the second mask having a passive pattern to merely protect the previously exposed first circuitry pattern and trim or eliminate a false edge outside of a circuit feature region without modifying the circuit feature, the second mask may have an active pattern to play a part in modifying, reshaping, or resizing the circuitry feature.

Advantageously, in this way the first mask and the pattern are not solely responsible for defining the size and/or the shape of a circuitry feature, and the second mask and the modifying pattern may assume some of the workload for defining the size and/or the shape of the circuitry feature.

Bae and Pierrat'734 are included here as described above.

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The teachings of Bae and Pierrat'734 differ from those of the applicant in that the applicant teaches the use of sub-resolution assist features in regions of the masks.

Pierrat '165 teaches a method comprising: identifying features in a pattern for a layer to be formed using a photolithographic mask, and adding sub-resolution features. The method includes laying out a complementary mask comprising opaque regions and transparent regions defining features having dimensions greater than a particular feature size.

And wherein said complementary mask comprises a binary mask.

It would have been obvious to one having ordinary skill in the art to take the teachings of Bae and Pierrat'734 and combine them with the teachings of Pierrat '165 in order to make the claimed invention because the use of sub-resolution features is so well known in the art that one would certainly know to use them in patterns where there is a need for finer resolution, which is their intended purpose.

Conclusion

Any inquiry concerning this communication or earlier communications from the Examiner should be directed to Stephen Rosasco whose telephone number is (571) 272-1389. The Examiner can normally be reached Monday-Friday, from 8:00 AM to 4:30 PM. The Examiner's supervisor, Mark Huff, can be reached on (571) 272-1385. The fax phone number for the organization where this application or proceeding is assigned is (703) 872-9306. Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

A handwritten signature in black ink, appearing to read 'S. Rosasco', with a stylized, sweeping underline.

S. Rosasco
Primary Examiner
Art Unit 1756

S. Rosasco
02/11/05